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From:
Trent Henderson, P.E.

Date:
October 21, 2004

Subject:
Former Boeing C-6 Facility
Building 1/36 Pre-Injection Test Plan

ARCADIS Project No.:
CA000594.00003

The purpose of this memo is to provide information on a Pre-Injection Test Plan to be implemented at the former Boeing C-6 facility (Site), Lot 8, Parcel C, which is shown on the attached site location map. The Pre-Injection Test will be conducted near the former Building 1/36 area. The purpose of this test injection is to determine how well the bio-amendment injection wells accept the molasses bio-amendment solution at the design volume, prior to finalizing the design.

The Los Angeles Regional Water Quality Control Board (RWQCB) previously approved a groundwater bioremediation work plan for the site, and issued a General Waste Discharge Requirements (WDR) permit. The Pre-Injection Test will not be performed prior to receiving approval from the RWQCB.

Purpose of Conducting the Pre-Injection Test:

A small portion of the total number of injection wells proposed for this Site have already been installed per the approved work plan to address the B- and C-Sands at the site. This proposed Pre-Injection Test will be conducted prior to installing the remainder of the injection wells.

The purpose of the Pre-Injection Test is to:

1. Verify that the bio-amendment wells can accept the full design volume of molasses amendment solution;
2. Develop injection procedures that maximize the introduction of solution into water-bearing units from amendment points;

3. Obtain process parameters (e.g., injection flow rates, injection pressures, etc.) that will be used in subsequent molasses injection events; and
4. Develop contingency plans to address unforeseen amendment system pressure/flow issues.

The Pre-Injection Test will be divided into two sections:

1. Testing of wells with injection of an un-buffered molasses solution; and
2. Testing of wells with a buffered molasses solution.

The design amendment injection volume for each well is 1,200 gallons of solution. Four test wells will be utilized, with two test wells screened in the B-Sand (AW0077B and AW0098B) and two test wells screened in the C-Sand (AW0074C and AW0095C). Each type of solution—un-buffered and buffered—will be injected into one of the test wells screened within the B- and C-Sand. The wells selected for the test injection are those that accepted water at the slowest rates during the well seal testing. The locations of the proposed injection and monitoring wells are shown on the attached figure, *Amendment Wells / Monitoring Wells Location Map*.

During the injections, process parameters (i.e., pressure, injection flow rate, and other observations) will be monitored and recorded on a regular time interval. Following the test, the data will be analyzed and reviewed and a report will be prepared that summarizes the findings and conclusions of the test. Data trends will be evaluated to determine if the injection flow rate decreases, and/or the injection pressure increases, with time and the volume of solution injected.

Pre-Injection Test Execution:

During the Pre-Injection Test, the bio-amendment wells will be connected to an injection manifold. The design volume (1,200 gallons) will be injected into each well. The injection pressure will not exceed 25 pounds per square inch (psig).

The following procedures will be followed during the test:

1. Initial pressure/vacuum readings will be recorded for each test well;
2. Amendment solution will initially be injected at a wellhead pressure not to exceed 15 psig;
3. If a zero-flow or low-flow condition exists, the wellhead pressure will be slowly increased to a maximum pressure of 25 psig;
4. If a zero-flow or low-flow condition persists at an applied pressure of 25 psig, the test well may need to be re-developed and/or re-installed;

5. Injection flow rate, pressure data, and siphoning ability will be recorded for each test well at regular intervals for a period of at least two hours, or until the final injection volume is reached, whichever occurs first;
6. Injection flow rates and pressures will be carefully monitored during the test to watch for sudden changes in flow rate or pressure. A sudden change from a low-flow rate, high-pressure condition to a high-flow rate, low-pressure condition could indicate a well seal failure has just occurred. If sudden performance changes are observed, the test wells will be re-checked for siphoning ability;
7. Depth to water measurements will be taken prior to and during the Pre-Injection Test to determine the influence to water levels during injection. These measurements will be taken at least once per hour during the injection from the three test wells that are not being injected into, as well as from wells AW0118B, TMW-08, WCC-07S, and AW0082C; and
8. Following the injection of the planned volume of amendment solution, approximately 50 gallons of potable water will be injected into the injection wells to flush the amendment solution from the well to prevent bio-fouling.

After the Pre-Injection Test has been completed in the field, the test data will be compiled, and a report will be generated that summarizes the findings.

WDR Monitoring:

Because this Pre-Injection Test will be performed on a small subset of the bio-amendment wells, the full WDR monitoring program will not be initiated during this test. Instead, the following Supplemental Monitoring Program is proposed to maintain compliance with the intent of the WDR permit conditions. Two wells, AW082C (a C-Sand injection well) and TMW-08 (a B-Sand monitoring well), will be used to monitor the pre- and post-test conditions of the aquifer in the B- and C-Sands. Baseline sampling will be performed prior to conducting the Pre-Injection Test, and post-test sampling will be conducted 2-, 4-, and 6-weeks following the completion of the test. The following parameters will be obtained during the four sampling events:

- Field parameters: temperature, pH, conductivity, oxidation/reduction potential (ORP), and dissolved oxygen (DO) concentration;
- Volatile organic compound (VOC) concentrations using the Environmental Protection Agency (EPA) Method 8260; and
- Total organic carbon (TOC) concentration using EPA Method 9060.

Additionally, baseline monitoring will include total alkalinity using EPA Method 2320B to determine the buffering capacity of the aquifer.

The two monitoring wells were selected based on their proximity to the B- and C-Sands test injection wells. Monitoring well AW0082C is approximately 85 feet to the east-southeast of injection well AW0074C. Monitoring well TMW-08 is approximately 90 feet to the southeast of injection well AW0118B. This group of monitoring wells should provide adequate coverage to determine the extent of TOC concentration increases and VOC concentration changes near the B- and C-Sands test injection wells.

Schedule:

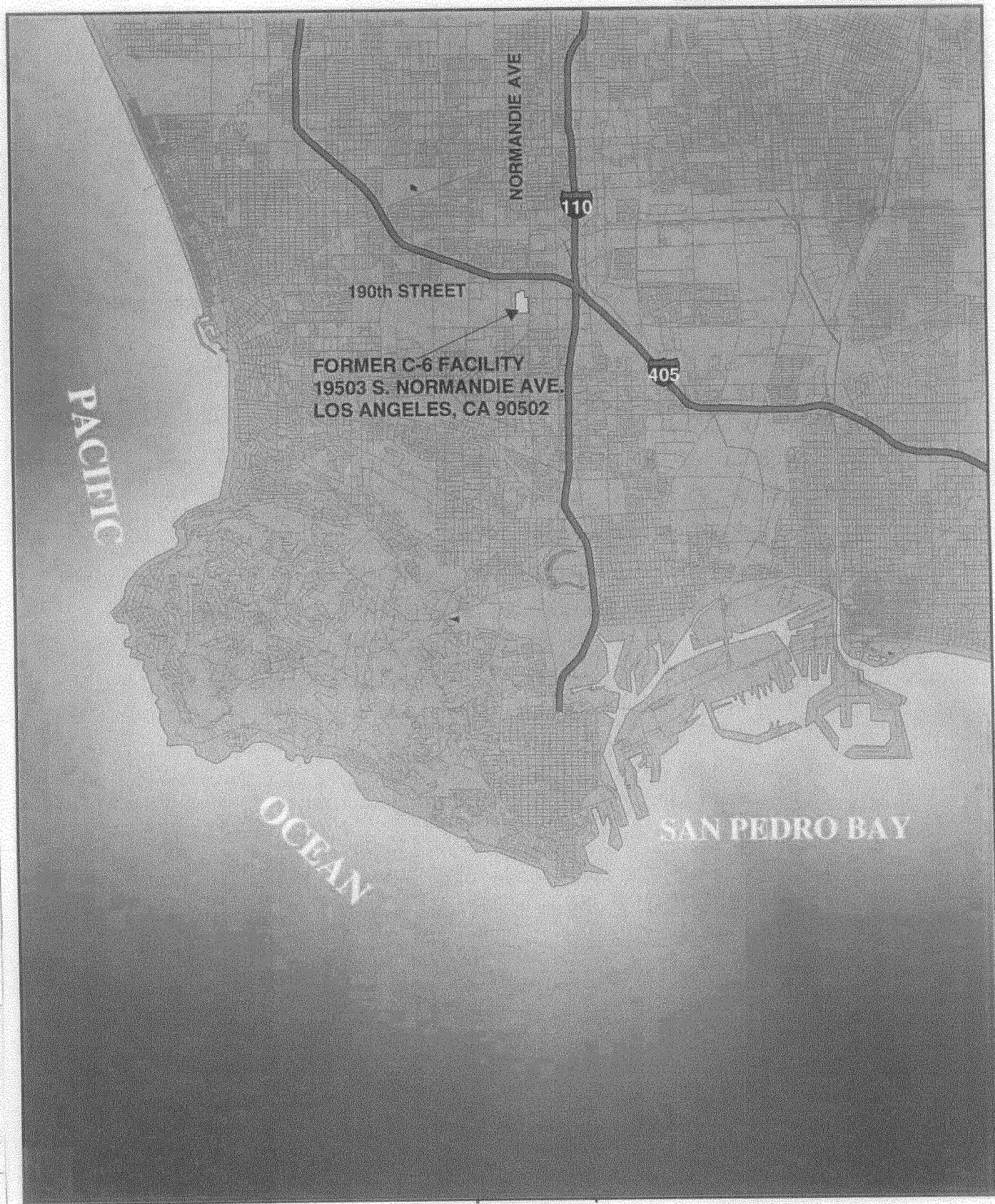
The proposed schedule to conduct the Pre-Injection Test is to start setting up the test program the week of October 25, 2004, and begin the Supplemental Monitoring Program starting two weeks following completion of the test. The test is expected to take three days in the field to complete, so the supplemental monitoring will commence on either November 9 or 10.

Reporting:

The results of the Pre-Injection Test will be summarized and presented in a report that will include graphs, figures, maps, etc. This report will be submitted to the RWQCB no later than January 31, 2005.

If you have any questions, or require any additional information, please contact me at (714) 278-0992, extension 3047.

Attachments



ARCADIS

SITE LOCATION

BOEING REALTY CORPORATION
FORMER C-6 FACILITY
LOS ANGELES, CALIFORNIA

FIGURE

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